Environmental Change & Fragile States
Early Warning and Intervention

NDIA Environment, Energy and Sustainability Symposium
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Topics

- Fragility as an Analytical Framework
- Army Relevance and Policy Drivers
- Phase I: Findings and Recommendations
- Phase II: Existing and Planned Initiatives

The mission of the Army Environmental Policy Institute (AEPI) is to assist the Army Secretariat in the development of proactive policies and strategies to address environmental issues that may have significant future impacts on the Army

Source: www.aepi.army.mil

Fragile State Defined: FM 3-07

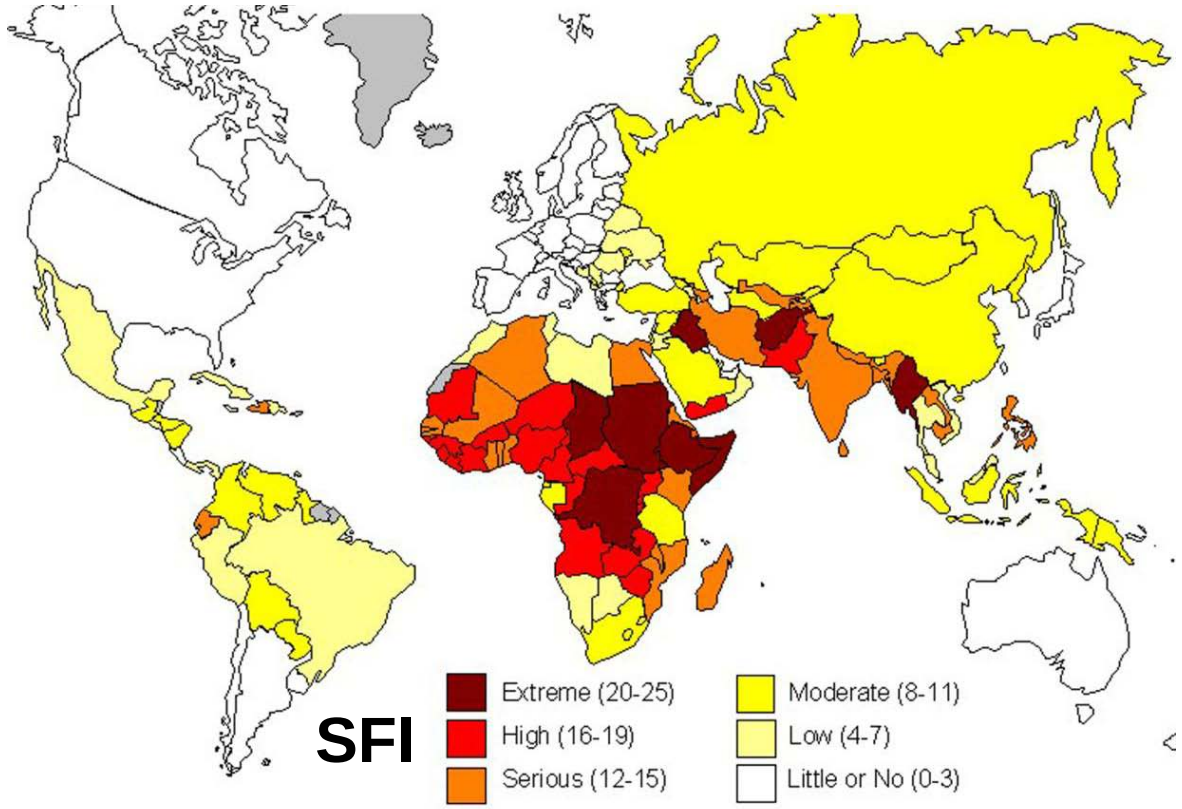
Effectiveness and Legitimacy

*A **fragile state** is a country that suffers from institutional weakness serious enough to threaten the stability of the central government … these weaknesses arise from several root causes including ineffective governance, criminalization of the state, economic failure, external aggression, and internal strife to disenfranchisement of large section of the population.*

The term fragile state refers to the broad spectrum of failed, failing, and recovering states – the distinction among them is rarely clear, as fragile states do not have a predictable path to failure or recover

Source: Army Field Manual 3-07 – Stability Operations, Oct 2008

Fragility as Global Threat



"America is now threatened less by conquering states than we are by failing ones" (National Security Strategy 2002)

"Proactively investing in stronger societies and human welfare is far more effective and efficient than responding after state collapse" (National Security Strategy 2010)

Source: Marshall and Cole. 2010. Global Report 2010; http://www.systemicpeace.org/inscr/SFImatrix2009c.pdf

Top 10 by Index

SFI 2009		FSI 2009	
1	Somalia	1	Somalia
2	Dem. Rep. of Congo	2	Zimbabwe
3	Sudan	3	Sudan
4	Afghanistan	4	Chad
5	Chad	5	Dem. Rep. of the Congo
6	Myanmar (Burma)	6	Iraq
7	Ethiopia	7	Afghanistan
8	Iraq	8	Central African Republic
9	Sierra Leone	9	Guinea
10	Burundi	10	Pakistan
48	Egypt	43	Egypt
93	Libya	112	Libya
97	Tunisia	121	Tunisia

Source: Marshall and Cole. 2010. Global Report 2010; http://www.systemicpeace.org/inscr/SFImatrix2009c.pdf & Fund for Peace. 2009. Failed State Index for 2010; http://www.fundforpeace.org

Relevance to the Army

- Fragility is part of **doctrine** and elaborated in FM 3-07
- Augments Army early warning and scenario planning tools to help prepare for **contingency planning**
- Theater security cooperation planning and **engagement**
- Proactively supports **situational awareness** and visibility of non-traditional threat areas prior to conflict
- Rapid and informed **smart power response strategies** – potential to avoid more expensive "late" responses
- Fragility is increasingly a focus of Stability, Security, Transition, and Reconstruction (**SSTR**) **operations**

Policy Drivers & Approaches

- National Security Presidential Directive (**NSDP-44**)
- Department of Defense Instruction **DoDI 3000.5**
- Army Field Manuals **FM 3-0** and **FM 3-07**
- 2010 Quadrennial Defense Review (**QDR**)
- Presidential Policy Directive (**PPD**) on Global Development

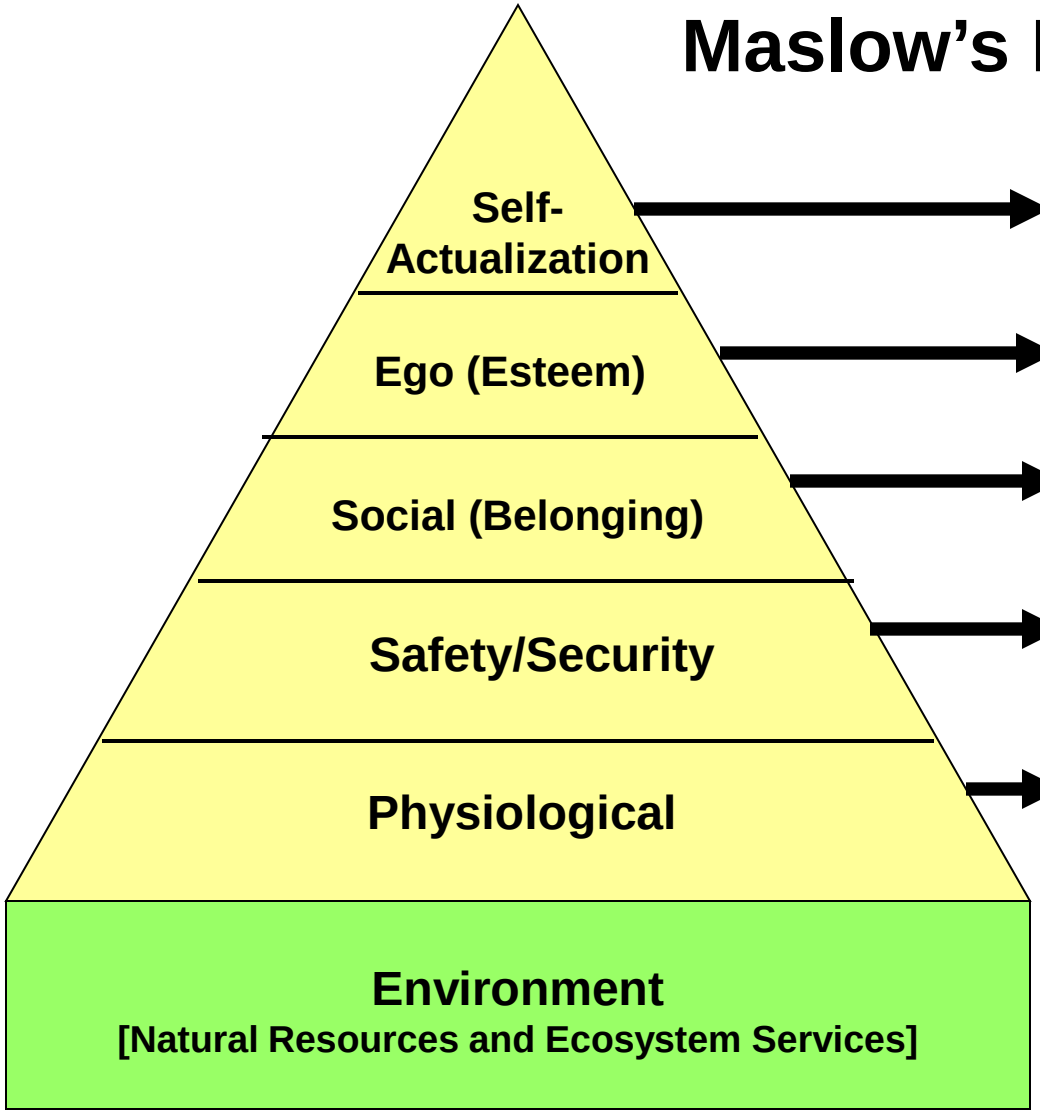
Unity of Effort Approaches

- **WoG** - Whole of Government
- **SMART Power –** hard / soft
- **DIME** – diplomatic, information, military, and economic
- **3Ds** – diplomacy, development, and defense
- **Full Spectrum Operations** – defense, offense and stability

Alignment of all instruments of national power to effectively meet the most challenging international objectives

Addressing Basic Human Needs

Maslow's Hierarchy



Challenging projects, opportunities for innovation and creativity, learning and creating at a high level

Important projects, recognition from others, prestige and status

Acceptance, be part of a group, identification with successful team

Physical safety, economic security, freedom from threats

Physical survival needs: water, food, shelter, warmth, sleep, etc.

Sources: Adapted from Maslow, 1943; Butts as reported by Damonte, 2006

Phase I Study Purpose

- Research the current state of both instability and fragility early warning systems, and assess their capabilities to account for environmental factors

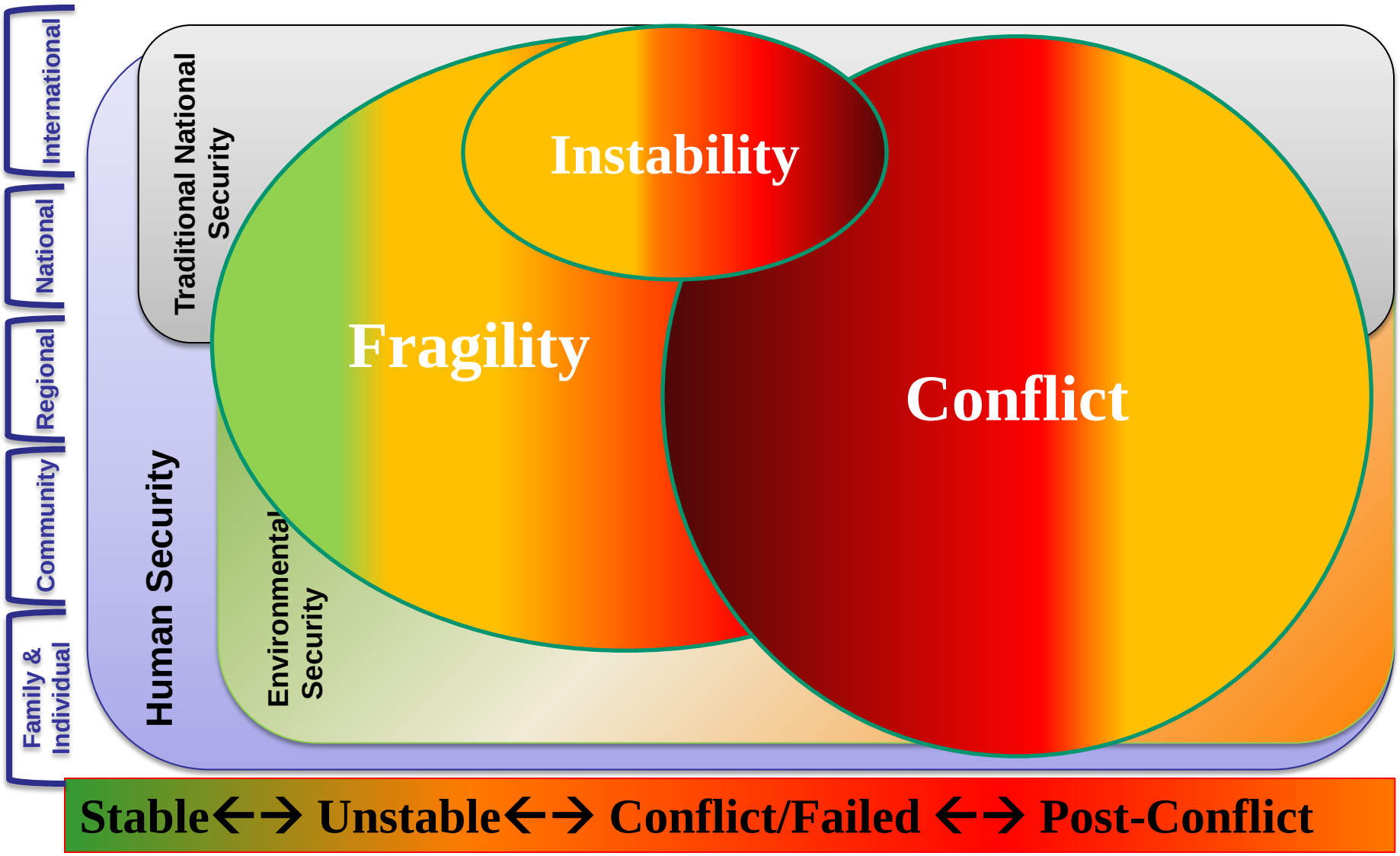
- Recommend how to incorporate such factors into meaningful frameworks supportive of U.S. Army, defense, and national security missions

Common Approaches to Conflict Models

- Pioneered in 1990's by State Failure Task Force, now PITF, models oriented on **state [violent] conflict**
- **Country** and Year are level of **data** aggregation
- Most models utilize "panel data" and use **linear regression statistics** to project future estimates
- PITF 5@ core parameters include:
  - Infant mortality, regime types, trade openess, population density, and neighbors in conflict (Source: PITF Phase III Report)
- PITF, PRIO, and others continued research using similar modeling approach to assess armed civil war
- Recent shift of focus to **low-level social violence**

Note: Political Instability Task Force (PITF) & Peace Research Institute Oslo (PRIO)

Fragility vs. Instability & Conflict



Source: AEPI. 2010. Environmental Factors in Forecasting State Fragility. See at: http://www.aepi.army.mil/

Fragility vs. Instability & Conflict

- **Instability …** ***the occurrence of severe political conflicts and regime crisis***
  - Revolutionary wars, ethnic wars, adverse regime changes, genocides and politicides (Source: Marshall, 2009 – Political Instability Task Force)

- **Most research to date has focused on factors that contribute to conflict**
  - Environmental factors have not shown strong correlation with instability or conflict indices to date – this project aimed to see what the correlation to fragility might be

- **Phase I Project was unique in that it compared environmental factors to fragility indices**

Fragility vs. Conflict Models

- ***Conflict*** **as dependent variable: logistic regression**

Predicts where conflict is most likely to occur next.

Phase I Project Focus

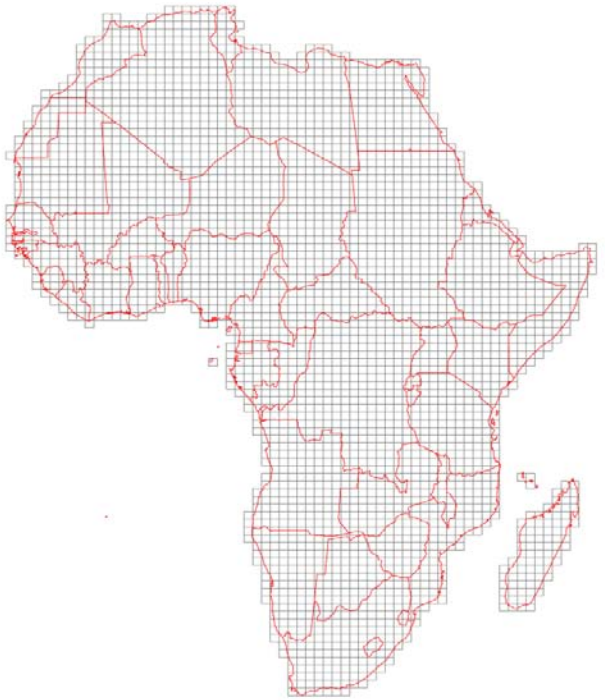
- ***Fragility*** **as dependent variable: ordinary least squares**

Assessment of condition of states along a continuum to anticipate earlier turning points and intervention.

Sources: Adapted from Carment *et al*., Security, Development, and the Fragile State, 2010; Agresti and Finlay, Statistical Methods for the Social Sciences, 2009.

Analytical Limitations

- Last 15-years has seen an explosion of conflict and instability research using **Large N statistical analysis**
- **Real world is more complex** and untidy than can be predicted regressing 4-5 variables at a national scale
- More recent analysis expanded from 200+ nations to thousands of **disaggregated grid pixels**
- **Context rich** subject matter expert, narrative case study, and event data **analysis alone are not a panacea either**



Source: Buhaug, H. and Ketil, J. 2006. Local determinants of African Civil Wars. Political Geography 25 (2006).

Phase I Recommendations

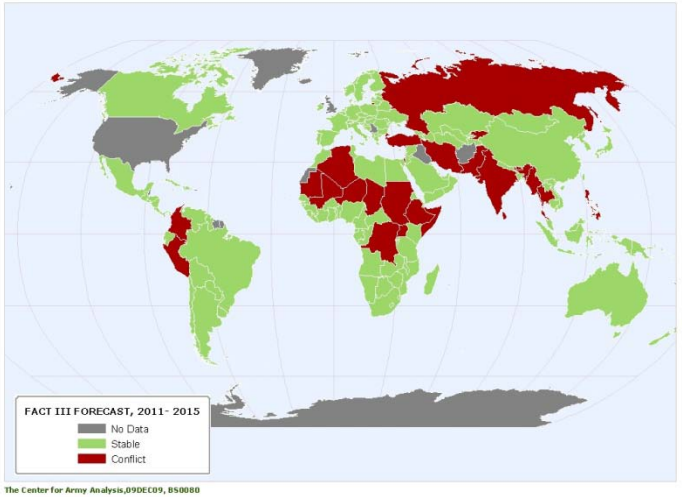
- **Engage stakeholders** within Army and other activities to better document, share, and leverage good practices
- Conduct additional research to more fully assess the effect environmental factors may have on fragility using **sub-national, temporal, and geospatial data**
- Apply **geospatial methods** in state fragility analysis to address data challenges and incorporate environmental conditions that do not reflect nation-state borders
- When using fragility as an early warning tool, utilize a **hybrid approach incorporating** qualitative and quantitative data
- Promote the development of **transparent fragility indices** that utilize **open source data** … these indices and early warning systems should expand to include both current and future threats related to the environment, such as **climate change**

Phase II Study Efforts Seek To…

- Explore opportunities for **whole of government** (smart power) **approaches**
- Identify **common fragility concept** to enable systematic coordination in support of early warning systems
- Identify **Army user needs** and technical resources
- Identify **USG data, analysis, and modeling capabilities**
- Map **concepts, needs, capabilities and gaps**
- Crosswalk to **identify climate linkages**

Forecast and Analysis of Complex Threats (FACT) III

- **Developed By the Center for Army Analysis, Ft. Belvoir, VA**



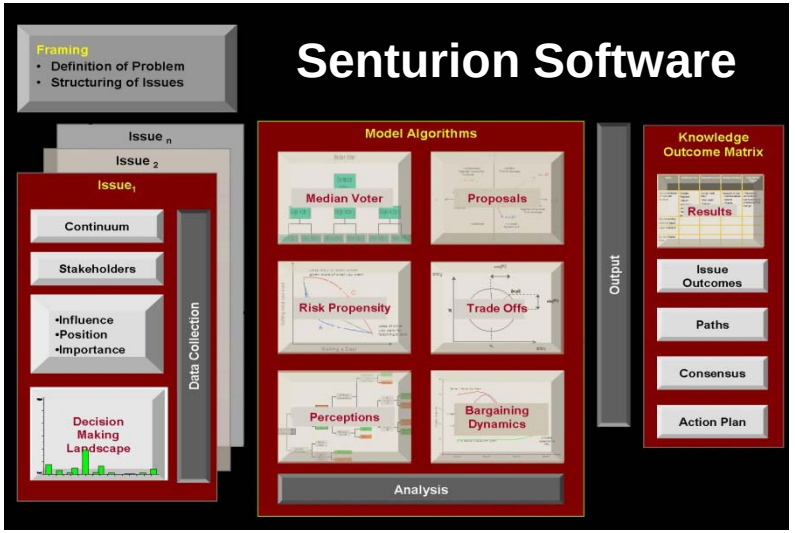
- **Purpose and Form**: Forecast of internal conflict in countries around the world
- **Level of analysis and timescale**: Country-level forecast, projections out to 2025.
- **Data collection**: Relies on set of 24 “indicators” from 8 sources. Useable historical data exists from 1993 - 2007
- **Analysis**: Model projects indicator values for each country. Countries are then matched to the 2 most similar historic countries, and assigned a conflict prediction. Ex: If Sweden (2012) looks like Afghanistan (1993) & Angola (1993), it is classified as in conflict.
- **User:** U.S. Army **Outputs:** Likelihood of internal conflict

Measuring Progress in Conflict Environments (MPICE)

- **Developed By the U.S. Corps of Engineers (USACE)**
- **Intended to measure outcomes during war to peace transition**
  - Assist in formulating policy and implementing strategic plans (e.g. part of the S/CRS Interagency Management System)
  - Evaluation tool to track progress toward goal accomplishment
- **Core capabilities include:**
  - Comprehensive, generic metrics *framework*
  - *Procedures* to "tailor" the metrics to the environment and mission
  - User's manual to provide *guidelines* for data collection methods
  - *Software* to archive, analyze, and visualize collected data
- **Data streams and analysis include:**
  - Content Analysis, Quantitative Data, Survey and Polling Data; and Expert Knowledge
- **Users:** Army strategic and operational planning personnel; in-theater military commanders and civilian decision makers (USAID)

Senturion

- **Developed By Sentia Group**
- **Purpose and Form:** A predictive political simulation model. Agent based model of behavior and interaction of decision makers
- **Level of analysis:** Any (local, domestic, international)



- **Data collection:** Subject Matter Expert interviews
- **Analysis:** Analyzes political dynamics to predict how positions of competing interests will evolve. Synthesizes political science, microeconomics, game theory, decision theory, and spatial bargaining
- **Users:** National Defense University, other DoD & commercial clients
- **Outputs:** Predicts outcome of complex political events. Gives detailed explanation of why outcomes occur (actor motivations)

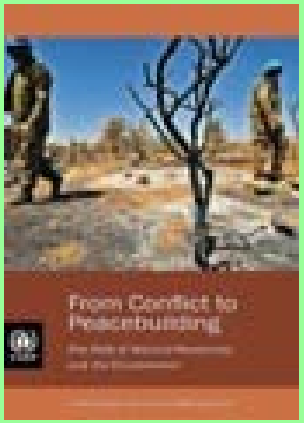
Integrated Crisis Early Warning System (ICEWS)

- **Developed By DARPA**
- **Purpose:** Monitor, assess, and forecast crises to support decisions on how to allocate resources to manage them
- **Level of analysis:** National, sub-national, and international. **Timescale**: quarterly, out to 8 quarters

- **Data collection:** 3 sources: (1) SME interviews about state leaders; (2) 8.7M news stories from 75 national, regional, and int'l sources; (3) macro-societal country data from various sources, e.g., World Bank
- **Analysis:** Based on best-of-breed integration of 4 different types of models (logistic regression, Bayesian statistics, geo-spatial networks, agent based model). *Fully automated* capability to monitor and forecast political activity around the globe
- **Users and Outputs:** Military commanders; projections of what countries may become unstable, why, and how to approach them

Environment as a Peacebuilding Tool

Promoting Regional Cooperation & Engagement



UNEP Report: *From Conflict to Peacebuilding*

Natural resources and the environment *can be involved in all phase of conflict cycle … cooperation over management of natural resources is investment in conflict prevention … provides new opportunities for peacebuilding*

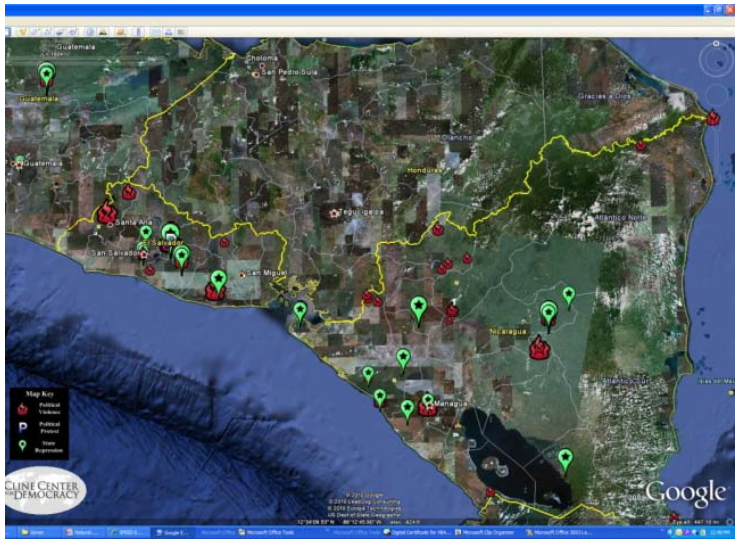
Source: http://www.unep.org/publications/search/pub_details_s.asp?ID=3998

Forthcoming **"*Strengthening Post-Conflict Peacebuilding through Natural Resource Management*"** by Environmental Law Institute (ELI), United Nations Environment Programme (UNEP), and University of Tokyo

- *Volume 1: High-Value Natural Resources and Post-Conflict Peacebuilding*
- *Volume 2: Land and Post-Conflict Peacebuilding*
- *Volume 3: Water and Post-Conflict Peacebuilding*
- *Volume 4: Livelihoods, Natural Resources, and Post-Conflict Peacebuilding*
- *Volume 5: Assessing and Restoring Natural Resources in Post-Conflict Peacebuilding*
- *Volume 6: Governance, Natural Resources, and Post-Conflict Peacebuilding*

Proactive Peacebuilding with Natural Resource Assets

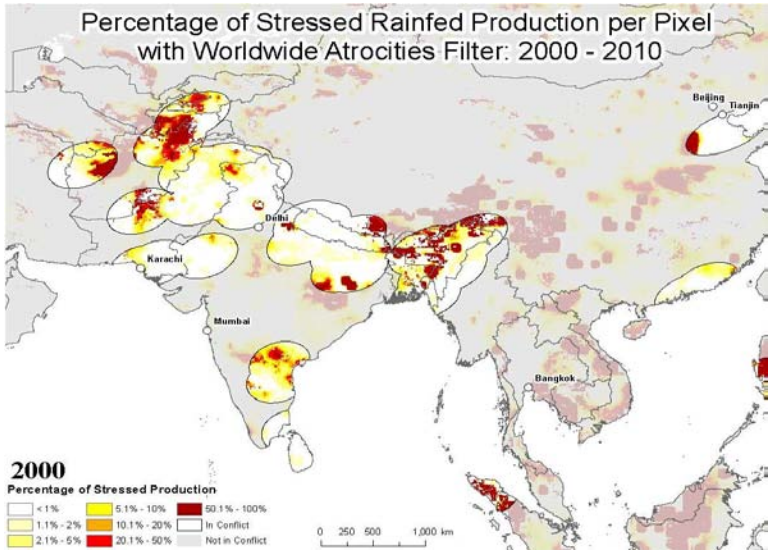
- **Developed By:** ERDC-CERL and Cline Center for Democracy
- **Sponsored By:** AEPI in collaboration with the Swedish Defense Research Agency (FOI)
- **Purpose:** Understand relationships between natural resources, civil unrest, resolution of civil conflicts



- **Level of analysis and timescale:** Sub-national analysis with event data (derived from media reports) from 1970s to present as well as case studies (Africa, Central America, Philippines).
- **Data collection and analysis:** Human codes BBC summary of world broadcasts events data and compares to qualitative case studies
- **Outputs:** Event database, geo-displays, analysis report

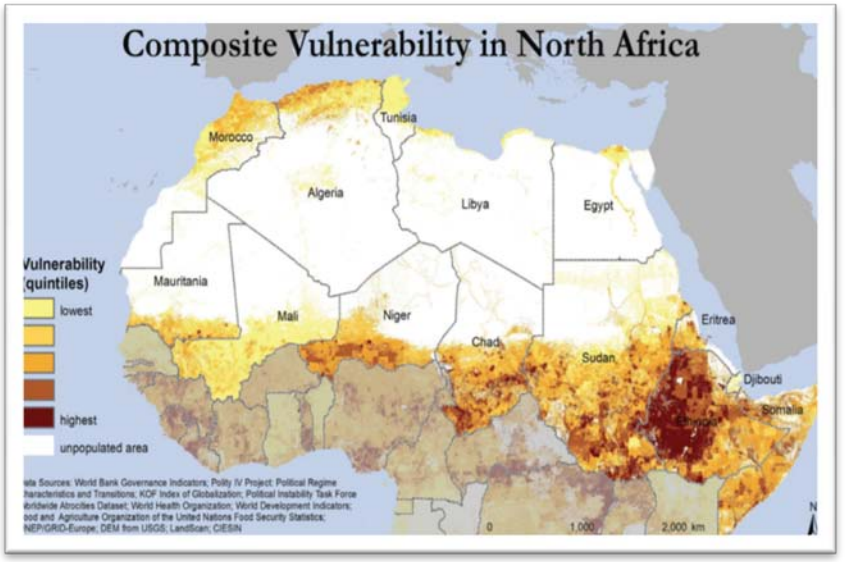
Environmental Indications and Warning (EIW)

- **Developed By:** Center Climate Change and National Security
- **Purpose and Form:** Provide early warning of environmental stress that may exceed local capacity to manage and adapt
- **Level of analysis:** Global thru sub-national – freshwater focus



- **Data collection:** 60-yr hydrologic history; open source socio-econ., political databases; conflict datasets **Timescale:** 6-9 month forecast
- **Analysis:** Initial focus on freshwater anomalies and population exposure to environmental stresses, people and regions affected, institutional capacity to manage, and severity of likely outcomes.
- **Users:** Intelligence analysts, USG agencies, combatant commands
- **Outputs:** Monthly reporting with forward projections

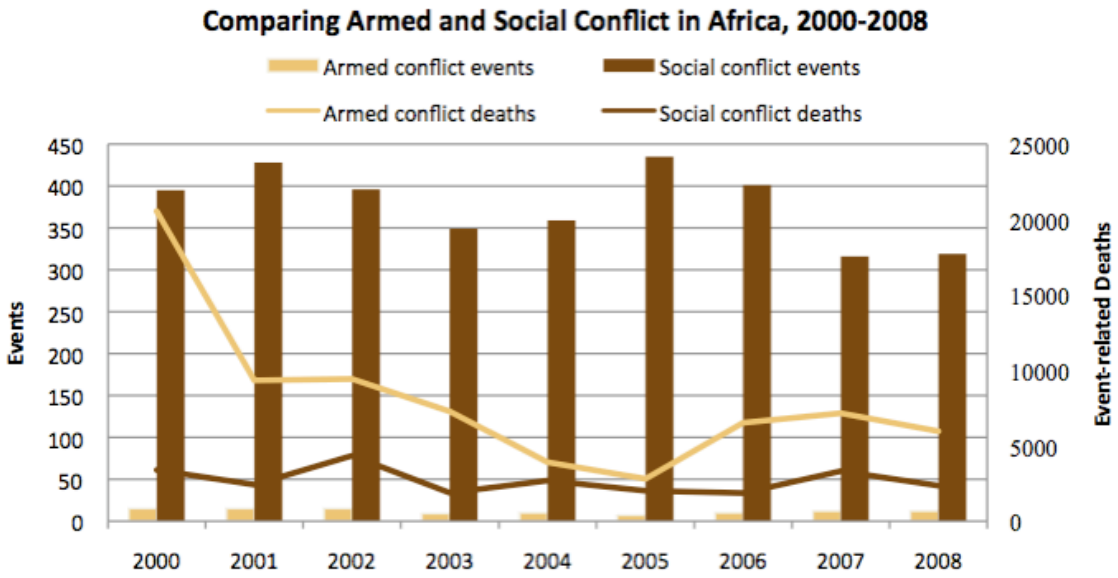
Climate Change & African Political Stability (CCAPS)



- **Developed by Univ Texas Austin** – 5 yr DoD funded Minerva Project
- **Purpose and Form:** Understand how climate change and vulnerability to natural hazards intersect with demographic, social, and political sources of weakness
- **Level of analysis:** Subnational **Timescale:** Current date
- **Data collection:** Four categories that include: Climate Related Hazard Exposure; Household & Community Resilience; Governance & Political Violence; Population Density
- **Analysis:** GIS analysis, using composite score of all four categories to identify vulnerable regions
- **Users and Outputs:** Open to public; maps of composite vulnerability

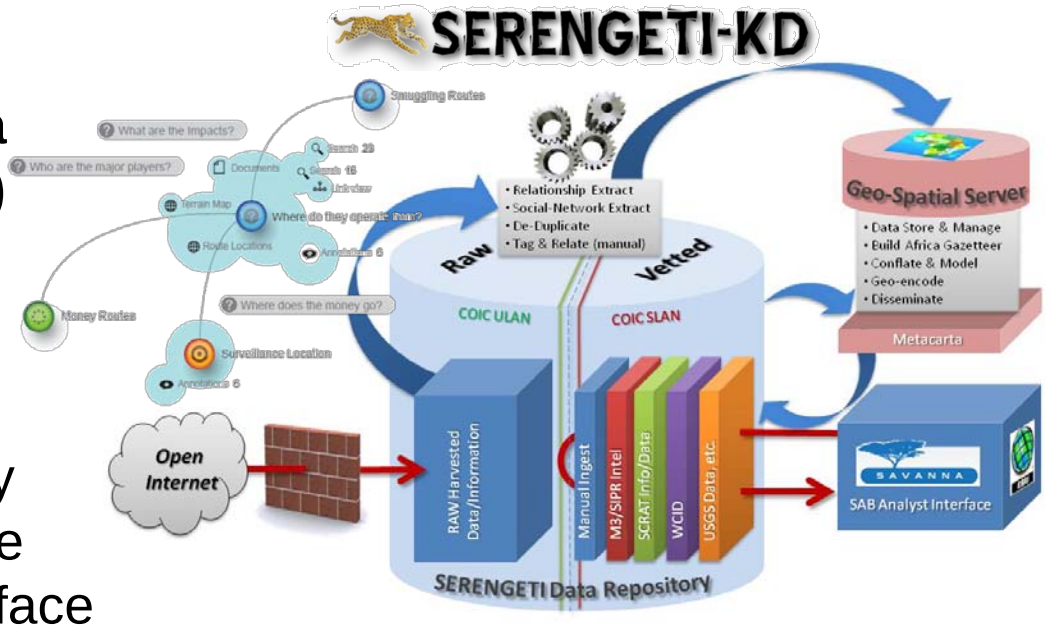
Social Conflict in Africa Database (SCAD)

- **Developed By Univ North Texas and Univ Texas** – 5 yr DoD funded Minerva Project
- **Purpose and Form:** Resource with over 6,000 social conflict events for conducting research and analysis on social and political unrest in Africa



- **Level of analysis and timescale:** Geocoded social events, such as riots, strikes, protests, coups, & communal violence, from 1990 to 2009
- **Data collection and Analysis:** Human compiled and coded data from Associated Press and Agence France Presse wire services
- **User:** Researchers and Practitioners **Outputs:** Social conflict data

SERENGETI



- **Developed By U.S. Africa Command (USAFRICOM)**
- **Purpose and Form:** Establishes Africa-centric data repository that is manually and automatically populated with open source data and has analytic interface
- **Level of analysis:** Geospatial regional to local architecture & analysis
- **Data collection:** Social Science Research Center & Field Research
- **Analysis:** Generates maps and model human terrain, searches data resources and visualize results; and builds automated reports; SAVANNA is the user interface that leverages data in SERENGETI
- **Users and Outputs:** AFRICOM Analysts can generate summary products at 3-levels, “Quick Look”, “Topic Reports”, and “Deep Dive”

Conclusions and Opportunities

- Shift toward **geospatial and disaggregated approaches** in conflict, natural security, and climate change arenas
- **Fragility** seems a **useful bridging concept** between conflict-instability and natural resource risks and opportunities
- **Climate security** studies are focusing on links to social conflict - **mapping to fragility** could further **relevance to the Army**
- Plethora of programs, datasets, and tools being developed but often **without a common lexicon** and user practitioner focus
- Opportunities to serve Army users with increased **situational awareness** and platforms for **smart power implementation**

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